

REMARKS

Claims 1-20 were pending in the above-identified application when last examined and are amended as indicated above. The claim amendments clarify the claim language and are not intended to limit the scope of the claims, unless the claim language is expressly quoted in the following remarks to distinguish over the art cited.

Claims 1-20 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Pat. No. 5,896,393 (Yard) in view of U.S. Pat. No. 5,379,413 (Hazen). Applicant respectfully traverses the rejection.

Independent claim 1 distinguishes over the combination of Yard and Hazen at least by reciting, "writing the first data back into the physical array after erasing the entire physical array."

Yard is directed to a file management system for a Flash memory having a plurality of erasable sectors. Yard discloses writing active data to an update sector before erasing a storage sector that originally stored the active data. See, for example, column 7, lines 33-39, where Yard states, "the update procedure operates by ... sequentially copying active files from their read address locations to locations within the update sector. If, during this copying process, read address register 30 crosses a sector boundary, the previous sector is erased." Yard fails to disclose erasing an entire physical array and writing data back after erasing the entire array.

The Examiner cites Hazen, particularly column 1, lines 40-44, of Hazen for disclosing this missing feature. Hazen starting at column 1, line 35 states, "A difficulty with flash EEPROM, however, is that it is very slow to erase. Flash EEPROM is erased by applying a high voltage simultaneously to the source terminals of all of the transistors (cells) used in the memory. Because these source terminals are all connected to one another by metallic busing in the array, the entire array must be erased at once. If any valid data remains in the array, it must be saved before erasure occurs and rewritten to the array after the array has been completely erased." Hazen when referring to erasing an entire array is thus referring to all the memory cells connected to a common source line (e.g., to one sector of a multi-sector Flash memory.)

The statement of Hazen regarding erasing a Flash EEPROM does not apply to Yard in that Hazen's statement applies to (an only correct for) a Flash memory that lacks separately

erasable sectors. Further, the combination of Yard and Hazen fails to suggest modifying Yard to write “the first data back into the physical array after erasing the entire physical array” because Yard teaches using multiple erasable sectors including an update sector. Yard’s file management system thus addresses the known problem of data loss when a sector is erased in a multiple-sector memory. One of skill in the art would not have been led to modifying Yard in view of Hazen as the Examiner suggests because such modification is contrary to the teaching and purpose of Yard’s invention.

In accordance with an aspect of the present invention, a non-volatile memory can use a data management process or arrangement to store data blocks in a manner that is not sector-based even when multiple sectors are present. This can improve storage efficiency because data blocks can be stored without unused storage cells between data blocks. Neither Yard nor Hazen provide or suggest such this or any other motivation for modifying Yard. Independent claim 1 is thus patentable over the combination of Yard and Hazen.

Claims 2-11 depend from claim 1 and are patentable over Yard and Hazen for at least the same reasons that claim 1 is patentable over Yard and Hazen.

Claim 4 further distinguishes over the combination of Yard and Hazen by reciting, “the physical array is partitioned into a plurality of separately erasable sectors, and erasing the entire physical array comprises erasing all of the sectors.” Claim 6 further distinguishes over Yard and Hazen at least by reciting, “writing data from different data blocks at consecutive addresses in the physical array, without regard for boundaries between sectors.” As noted above, Yard uses sector boundaries for selection of the data erased and retained, and Hazen describes erasing an entire array when there are no sector boundaries.

Independent claim 12 distinguishes over the combination of Yard and Hazen at least by reciting, “selecting one or more of the data blocks for erasure; reading from the array data corresponding to all of the data blocks that are not selected for erasure; storing in the storage device, the data read from the array; erasing the array in entirety; and writing into the first memory, the data from the storage device.”

Yard, as noted above, is directed to file management but fails to suggest erasing the array in its entirety and rewriting the data to be kept. Hazen fails to suggest modification of Yard because Hazen is not directed to file management system or erasing an entire array in a multi-sector system such as Yard. Accordingly, claim 12 is patentable over the combination of Yard and Hazen.

Claims 13-20 depend from claim 12 and are patentable over Yard and Hazen for at least the same reasons that claim 12 is patentable over Yard and Hazen.

Claim 18 further distinguishes over the combination of Yard and Haze by reciting, "the array is partitioned into a plurality of separately erasable sectors, and erasing the array comprises erasing all of the sectors." Claim 20 further distinguishes over Yard and Hazen by reciting, "the writing comprises writing data from different data blocks at consecutive addresses in the array, without regard for boundaries between sectors." Yard and Hazen fail to suggest such use of memory having multiple erasable sectors.

For the above reasons, Applicant requests reconsideration and withdrawal of the rejection under 35 U.S.C. § 103.

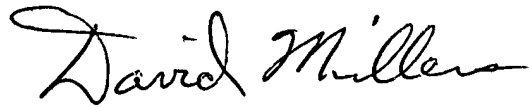
In summary, claims 1-20 were pending in the application. This response amends claims 17-20 to correct errors. For the above reasons, Applicant respectfully requests allowance of the application including claims 1-20.

Please contact the undersigned attorney at (408) 927-6700 if there are any questions concerning the application or this document.

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Respectfully submitted,



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